Notice of Allowability	Application No.	Applicant(s)	
	10/678,546	BORRAN ET AL.	
	Examiner	Art Unit	
	Jaison Joseph	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment filed on 10/28/2005*.

2. ☒ The allowed claim(s) is/are *1-23*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 12/27/2005
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Gerald Stanton on 01/13/2006.

The application has been amended as follows:

In the specification, page 5, lines 21 change "... U.S. Patent Application No. [XX/XXXXXX],..." to "...U.S. Patent Application No. 10/607406,..." .

Claim 1 rewrite as: A method for encoding a plurality of bits, comprising:

based on a plurality of bits, selecting one of at least two mutually exclusive subsets of a signal constellation and a point within said selected subset;

modulating the selected point using a carrier waveform; and

transmitting the modulated point,

wherein the selected subset includes at least two constellation points that are separated from one another by a distance based on a conditional distribution that is a function of a characteristic of a channel through which the modulated point is transmitted.

Claim 4 rewrite as: A method for encoding a plurality of bits, comprising:

based on a plurality of bits, selecting , based on a plurality of $m=k_1+k_2$ of bits, using k_1 of the bits to select one of at least two mutually exclusive subsets of a signal

constellation and using k_2 of the bits to select a point within said selected subset, wherein m, k_1, k_2, are non-zero integers; and

modulating the selected point using a carrier waveform, wherein the selected subset includes at least two constellation points that are separated from one another by a distance based on a conditional distribution that is a function of a characteristic of a channel through which the modulated point is to be transmitted, and

wherein using k_1 of the bits to select said subset comprises encoding the k_1 bits into encoded bits, and selecting one of 2^n mutually exclusive subsets with the n encoded bits, wherein n is greater than k_1.

Claim 7, rewrite as: A method for encoding plurality of bits, comprising:

based on a plurality of bits, selecting one of at least two mutually exclusive subsets of a signal and a point within said selected subset;

modulating the selected point using a carrier waveform; and

transmitting the modulated point,

wherein the selected subset includes at least two constellation points that are separated from one another by a distance based on a conditional distribution that is a function of a characteristic of a channel which the modulated point is transmitted, and wherein the constellation points define concentric circles, and every point lying within a circle is from a different subset from every other point lying on that circle.

Claim 11 rewrite as: A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;

a mapper having an output coupled to an output of the encoder;

a computer-readable medium storage coupled to the mapper for storing at least one signal constellation;

a modulator having an input coupled to an output of the mapper; and

a transmit antenna having an input coupled to an output of the modulator,

wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least two constellation points that are separated from one another by a distance based on a conditional distribution that is a function of a characteristic of a channel through which a signal from the transmit antenna is to be transmitted.

Claim 14 rewrite as: A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;

a mapper having an output coupled to an output of the encoder;

a computer-readable medium storage coupled to the mapper for storing at least one signal constellation;

a modulator having an input coupled to an output of the mapper; and

a transmit antenna having an input coupled to an output of the modulator,

wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least two constellation points that are separated from one another by a distance based on a conditional distribution that is a function of a characteristic of a

channel through which a signal from the transmit antenna is to be transmitted, and wherein the encoder encodes k_1 of the bits into n encoded bits, and the mapper selects one of 2^n mutually exclusive subsets using the n encoded bits, wherein n is greater than k_1.

Claim 17 rewrite as: A transmitter for transmitting a series of input bits comprising:

an encoder having an input for receiving a plurality of input bits;

a mapper having an output coupled to an output of the encoder;

a computer-readable medium storage coupled to the mapper for storing at least one signal constellation;

a modulator having an input coupled to an output of the mapper; and

a transmit antenna having an input coupled to an output of the modulator,

wherein the mapper selects a subset of said signal constellation and a point within the selected subset based on the plurality of input bits, said selected subset including at least two constellation points that are separated from one another by a distance based on a conditional distribution that is a function of a characteristic of a channel through which a signal from the transmit antenna is to be transmitted, and wherein the constellation points define concentric circles, and every point lying within a circle is from a different subset from every other point lying on that circle.

Claim 21 rewrite as: A method for encoding plurality of $m=k_1+k_2$ bits comprising:

selecting a subset of a signal constellation based on the k_1 input bits;

selecting a point within the selected subset based on the k_2 input bits, wherein at least two points within the selected subset are spaced from one another by a distance based on a conditional distribution that is a function of a characteristic of a channel through which the selected point is to be transmitted ~~of at least one of said at least two points:~~ and

modulating the selected point using a carrier waveform,

wherein m, k_1, and k_2, are non-zero integers, and at least one of k_1 and k_2 are greater than one.

Claim 22 rewrite as: A method for encoding plurality of $m=k_1+k_2$ bits comprising:

selecting a subset of a signal constellation based on the k_1 input bits;

selecting a point within the selected subset based on the k_2 input bits, wherein at least two points within the selected subset are spaced from one another by a distance based on a conditional distribution that is a function of a characteristic of a channel through which the selected point is to be transmitted ~~of at least one of said at least two points:~~ and

modulating the selected point using a carrier waveform,

wherein m, k_1, and k_2, are non-zero integers, and at least one of k_1 and k_2 are greater than one, and

wherein selecting a subset of a signal constellation based on the k_1 input bits comprises encoding the k_1 input bits into n encoded bits, and selecting one of 2^n subsets using the n encoded bits, wherein n is an integer greater than k_1 thet is derived from k_1 bits and a previously input plurality of bits.

REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance: Claims 1 – 23 are allowable over prior art of record. As per claims 1, 3 – 11, 13 – 19, and 21 – 23, the prior art of record failed to disclose a method and apparatus for encoding a plurality of bits, comprising selecting one of at least mutually exclusive subsets of a signal constellation and a point within the selected subset wherein the selected subsets includes at least two constellation points that are separated from one another by a distance based on a conditional distribution that is a function of a characteristic of a channel through which the modulated point is transmitted, as claimed in the independent claim 1 and similar claimed subject matter in independent claims 4, 7, 11, 14, 17, 21, and 22. Thus claims 1, 3 – 11, 13 – 19, and 21 – 23 found novel and unobvious over prior art of record.

As per claims 2, 12, and 20, the prior art of record failed to disclose a method and apparatus for encoding a plurality of bits, comprising selecting one of at least mutually exclusive subsets of a signal constellation and a point within the selected subset wherein the selected subsets includes at least two constellation points that are separated from one another by one of Kullback-Leibler distance and an expected Kullback-Leibler distance as claimed in independent claim 2 and similar claimed subject matter in independent claim 12. therefore, claims 2. 12 and 20 found novel and unobvious over prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jaison Joseph whose telephone number is (571) 272-6041. The examiner can normally be reached on M-F 8:30 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jaison Joseph
01/17/2006

DACHA
PRIMARY EXAMINER